FAA Safety BRIEFING

July/August 2013

Your source for general aviation news and information

Be Prepared

What Would MacGyver Do?, p. 10

Defensive Flying – Staying One Step Ahead, p. 14

Beyond the Checklist, p. 17

Federal Aviation Administration

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FAA Safety Briefing is the FAA safety policy voice of non-commercial general aviation.

The July/August 2013 issue of *FAA Safety Briefing* focuses on airman preparedness. Articles explore procedures, techniques, and equipment that can help you stay ahead of the aviation safety curve and prepare for the unexpected.

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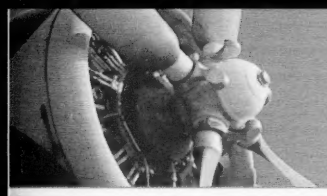

JOHN ALLEN
DIRECTOR, FLIGHT STANDARDS SERVICE

Preparing for the Unpredictable

Prepare for the unknown by studying how others in the past have coped with the unforeseeable and the unpredictable.

— Gen. George S. Patton

As I have noted in these pages before, I caught the aviation bug at an early age when my cousin and I listened with rapt attention to the stories my dad — a wartime pilot — and his friends used to tell. I knew back then that I wanted a career that involved flying. In part because of my dad's example, I started as he did: I worked as hard as I could, watched for every opportunity, and prepared myself to move from inspiration and aspiration to the realization of that dream.

And so, like my dad, I served for many years as a military aviator. Though I did not imagine back then that I might wind up working for the FAA — much less as the director of the Flight Standards Service — my personal and professional background provided much of the education, training, and experience that prepared me for this position.

It's Not About "Luck"

If there is anything I have learned from the twists and turns taken throughout my life and career, it would be just how much truth there is in the old cliché about how the thing we call "luck" is really just the point where opportunity meets preparation. We tend to think of that phrase in terms of its application to careers, and certainly the preparation-plus-opportunity-equals-luck equation applies in that arena. But it clearly applies to aviation as well.

We have all heard and read about "lucky" pilots who walked away from events that could have had a very different outcome. A lifetime in aviation, including stints as an aviation instructor and evaluator, leads me to believe that the chance-driven variety of luck usually has little to do with it. Rather, I strongly believe that an aviator's luck is the self-made version, one that demands years of constant, dedicated study and preparation.

You will find a lot of tips on aviation preparedness in this issue of *FAA Safety Briefing*. However, the quote at the top of this page summarizes a lot of what true aviation preparedness means to me. In any aviation training program, the formal curriculum necessarily and appropriately focuses most heavily on preparing for what is *known*. We learn about known aerodynamic principles and their practical implications for flight. We learn about known aircraft systems and performance capabilities, using carefully developed charts and graphs to gauge whether and under what circumstances the aircraft can do what we ask it to do. And, notwithstanding all the jokes about the uncertainties inherent in weather forecasting, we learn about known principles of meteorology. This list goes on.

An aviator's luck is the self-made version, one that demands years of constant, dedicated study and preparation.

I submit, however, that mastering what is *known* is only the most basic, necessary-but-not-sufficient aspect of preparedness. Aviation safety demands that we also seek to prepare for the *unknown*, and that is where the late General Patton's counsel comes into play. We prepare for the unknown in two key ways. First, we prepare by learning as much as possible about, well, *everything* related to aviation. Second, we learn from how other aviators have coped with unusual circumstances.

Aviation safety demands that we seek to prepare for the *unknown*.

Aviation history is replete with illustrative examples. Two famous events — United 232's loss of all hydraulics in 1989, and USAirways 1549's goose-induced dual flameout in 2009 — come to mind as case studies in how the pilots' mastery of the known prepared them to cope with the unforeseen and the unpredictable. Yes, they were "lucky" — because when the opportunity presented itself in the form of a life-or-death challenge, these aviators were prepared to take it on. We should all aspire to do likewise.

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End of the PTS?

Documents published in the April 25, 2013 *Federal Register* at the request of the government/industry Airman Testing Standards and Training Working Group (ATST WG) mark the first stage in the FAA's plan to overhaul the content, process, and methodology for its airman certification training and testing system.

Publication of these documents is part of an ongoing process that began in September 2011, when the FAA chartered an Airman Testing Standards and Training aviation rulemaking committee (ARC) to make recommendations on these issues. The ARC included broad representation from the aviation community, including industry associations, universities, training providers, and professional associations. The ARC submitted its report and nine recommendations to the FAA in April 2012, and in September 2012, the industry-led ATST WG was established to implement some of these recommendations.

A key ARC recommendation was to develop a comprehensive Airman Certification Standards (ACS) document for each certificate and rating by integrating task-specific knowledge and risk management into the existing practical test standards (PTS) areas of operation. To demonstrate the concept, the ATST WG developed draft ACS documents for the private pilot certificate and the instrument rating. These documents align the aeronautical knowledge testing standards required by 14 CFR part 61 with the flight proficiency standards set out in the existing PTS. Where appropriate, the ATST WG consolidated overlapping and/or duplicative areas of operation or tasks.

Because the ACS documents will serve as the foundation of transition to a more integrated and systematic approach to airman certification testing and training, the ATST WG asked the FAA to make its draft ACS documents for the private pilot certificate and the instrument rating available to the public for review and comment. The comment period closed on July 8, and the ATST WG will use the comments it received to refine its ongoing work.

In addition to the private and instrument ACS documents, the ATST WG is developing a proposed ACS for the authorized instructor certificates and ratings. Other tasks include developing a detailed proposal to align and, as appropriate, consolidate existing FAA guidance material (e.g., H-series handbooks) with the ACS documents, and to propose methodologies to ensure that knowledge test questions are consistent with both the ACS documents and test question development principles included in the ARC's recommendations.

The Aviation Rulemaking Advisory Committee ATST WG is scheduled to provide its final report with draft documents and recommendations by September 30, 2013.

WAAS Tenth Anniversary

After great anticipation, the Wide Area Augmentation System (WAAS) was commissioned for use in the U.S. National Airspace System on July 10, 2003. In 2003, there was only a handful of WAAS Localizer Performance with Vertical guidance (LPV) approach procedures published. There was also just a small number of certified WAAS Instrument Flight Rules (IFR) receivers in use. WAAS was just getting started; the world's first operational satellite based augmentation system (SBAS) was the new kid on the navigation systems block.

Today, ten years later, thousands of users rely on WAAS to get them safely to their destinations. There are over 3,000 WAAS LPV approach procedures in existence currently, far more than the number of runways serviced by the previous industry staple, the Instrument Landing System (ILS). WAAS LPV approach procedures exist at all types of airports throughout the nation, from rural Alaskan airports to community and regional airports, as well as most major metropolitan airports.

There have been over 90,000 WAAS IFR receivers sold for aviation. This number continues to steadily

increase. WAAS also has a strong non-aviation following. WAAS can be found in nearly every non-GPS receiver on the market and has become an indispensable utility in many mapping, forestry, and marine applications.

Finally, WAAS is an example of U.S. technological ingenuity that is spreading globally. Since its commissioning, WAAS coverage has expanded to include Canada and Mexico in coordination with our international partners. Additionally, similar, interoperable systems are being implemented worldwide. These include the European Geostationary Navigation Overlay System (EGNOS), Japan's MTSAT Satellite-based Augmentation System (MSAS), India's GPS Aided GEO Augmented Navigation (GAGAN), and others.

So, on July 10, wherever you are, don't forget to say, "Happy Anniversary WAAS!" It's been a great first 10 years with more to come! More information is available at http://gps.faa.gov.

Photo by Tom Hoffmann

FAA Safety Briefing Wins Publication Award

During a special ceremony at this year's Paris Air Show, Flight Safety Foundation (FSF) presented the *FAA Safety Briefing* magazine with the Cecil A. Brownlow Award, an award which recognizes significant contributions by journalists to aviation safety awareness. First presented in 1968 as the FSF Publication Award, the award was renamed in 1988 in memory of Cecil A. Brownlow, a veteran newspaper, wire service, and magazine journalist who was the FSF editor of publications from 1981 until 1988. An independent board makes the selection for the award from nominations throughout the world's aviation community.

"It is truly an honor to receive this award and to be recognized alongside so many other talented aviation writers and publications," said Tom Hoffmann, *FAA Safety Briefing's* managing editor. For a list of previous Cecil A. Brownlow Award winners, go to http://flightsafety.org/aviation-awards/fsf-cecil-brownlow-publication-award.

AirVenture Bound? Don't Forget the NOTAM

If you're planning to fly in to EAA's AirVenture via Wittman Regional Airport (KOSH) or one of the surrounding areas, you'll need to review the AirVenture NOTAM, available for download at www.airventure.org/flying/2013_notam.pdf. The NOTAM, which is in effect from 0600 Friday, July 26, through noon on Monday, August 5, outlines procedures for the many types of aircraft that fly to Oshkosh for the event, as well as aircraft that land and depart at nearby airports. It was designed by FAA in partnership with EAA to assist pilots in their flight planning and is required reading if you're flying your aircraft to AirVenture. Some of the changes for this year include a revised sequence of VFR arrival pages, revised IFR arrival and departure procedures, and updates to taxiways at KATW.

While you're there, don't forget to check out this year's GA Award winners at a special ceremony in the "Theater in the Woods" pavilion. Check www.airventure.org for date and time information. For more on the award winners, see pages 24 and 25.

New Web Enhancements Made to Lockheed Martin Flight Services

A new release of Lockheed Martin Flight Services' (LMFS) Pilot Web Portal, introduced last April, offers several new features for pilots. Among them is a new surveillance-enhanced search and rescue feature. If you have a satellite-based position reporting device for your aircraft, you can now register for reporting in your aircraft profile. Lockheed Martin's system will automatically begin monitoring your flight upon activating your flight plan. If you choose not to have LMFS monitor a particular flight, simply deselect this option for that flight. If the system detects that the aircraft has stopped moving, or if it stops receiving position reports, LMFS will begin the search and rescue process. Currently the only device supported is from SpiderTracks (www.spidertracks.com); however, LMFS is actively pursuing other service providers.

Also, for the first time on any web site, you can

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now activate your VFR flight plan directly from the Pilot Web Portal. All of these features are available free to registered users. To find out more or to become a registered member, go to https://lmfsweb.afss.com.

FAA Administrator Calls for More Action on GA Safety

In preparation for the busy summer flying season, FAA Administrator Michael Huerta met last May with leaders from the general aviation community to agree on actions to enhance safety and reduce accidents. The GA fatal accident rate has remained flat over the past five years and, as of May, 149 fatal accidents have occurred this fiscal year, killing 262 people.

"We cannot become complacent about safety," Huerta said. "Together, we must improve the safety culture to drive the GA fatal accident rate lower."

In the short term, the group agreed to raise awareness on the importance of basic airmanship and to promote a positive safety culture.

For the long term, Administrator Huerta called on the aviation community to install life-saving equipment (angle of attack indicators, inflatable restraints, two-axis autopilots) in older airplanes, to improve GA data, and to improve airman certification testing and training. To meet these goals, the GA community and the FAA agreed to work together to move forward as quickly as possible on three key initiatives: participate and invest in the General Aviation Joint Steering Committee (GAJSC), support the overhaul of airmen testing and training standards, and expedite the part 23 certification process to reduce costs and install new technology in airplanes.

For an updated fact sheet on GA safety, go to http://go.usa.gov/Ttzh.

TOM HOFFMANN

Are You Prepared?

How to Get the Most Out of Your AirVenture Adventure

Airshows and fly-ins are perfect opportunities for learning and having fun, but they can sometimes be a tad overwhelming. Having been to several of the large-scale variety of these aviation events, I can personally vouch for the benefit of having a good plan. Whether it's your first or 101st time at an airshow, you can never be too prepared.

As stated in the pilot preflight requirements in 14 CFR 91.103, start by getting familiar with all available information concerning the event. A good place to get prepped for an airshow like AirVenture is its main website (www.airventure.org), where you can scope out everything from aerobatic performance times to where the highly-coveted flush toilets are located. Once you have a general outline of your top priorities, try to build your schedule around those activities. If your luck is like mine, there always seems to be two events going on at the same time, so be ready to scratch a few things off your list. However, events like educational seminars or airshow performances are sometimes repeated during the span of the event, so you may get lucky and have a second chance to catch it.

To assist with budgeting your time efficiently, try using AirVenture's website to select your events and create a custom itinerary, a feature I always try to use. If you prefer your information on the go, AirVenture has a handy and free smartphone app you can download that includes daily highlights, performance times, seminar schedules, and much more. For up-to-the-minute changes or special promotions, consider following some of your favorite vendors or performers on Twitter or Facebook — and don't forget that you can also follow us at @FAASafetyBrief. A daily newspaper is also produced during AirVenture. It lets you see what's happening each day, as well as catch up on news, events, and photos from previous days. In a pinch, it also makes for a good fan, fly-swatter, and emergency rain shield.

A schedule of the FAA Safety forums is available at the AirVenture site, at www.FAASafety.gov, or on the following page of this magazine. With six daily safety forums and ice-cold air conditioning, the FAA Safety Center is the perfect place to stay cool and dry and get educated on all things aviation safety. And be sure to grab a copy of *FAA Safety Briefing*!

Having a Plan B is always a good idea at AirVenture. If the airshow is a washout or a seminar is cancelled, consider what your backup plans will be. There are plenty of indoor venues and exhibits that will keep you happily occupied. And don't forget to factor in places to rest as well as to eat. You'd be surprised how much walking you do and there's nothing like a nasty hunger headache to ruin the rest of your day. Other essentials include a hat, sunglasses, sunblock, comfy shoes, and the all-important water bottle.

While AirVenture may be the center of the aviation universe, its enormous size can sometimes make attendees feel a bit "lost in space." To stay on track and help you mitigate the fatigue factor, keep a map handy and take advantage of the color-coded tram system that circuits the grounds. A tram ride that loops around the field is a good way to get your bearings before you get started, or to take a well-deserved break. The slow-moving trams also provide for some great photo ops and allow easy access to some of AirVenture's more remote areas.

Finally, be sure to include some personal interaction during your airshow experience. It's the perfect place for like-minded airplane people to network, ask questions, and make new friends; you just never know who you'll meet. This sense of community is what keeps the spirit of aviation alive and well.

Do you have any personal tips on how to get the most out of your next airshow or fly-in event? Please share them at FAASafetyBrief@faa.gov.

Tom Hoffmann is the managing editor of the FAA Safety Briefing. *He is a commercial pilot and holds an A&P certificate.*

Photo by Tom Hoffmann

2013 AIRVENTURE OSHKOSH EAA

FAA Safety Forums
July 29 — Aug 4, 2013

	0830—0945	1000—1115	1130—1245	1300—1415	1430—1545	1600—1645
Monday, July 29	***What and What Not to Say / Controller*** Steve Hansen NATCA GL0349729	***Maintenance Findings in Accident Investigations*** Richard D. Anderson, Jr FAA Inspector GL0349730	***Flight Safety Considerations Using an iPAD*** Devan Shepherd FAASTeam Lead Representative GL0349731	***Maintaining a Healthy Mind and Body as a Maturing Aviator*** Philip Tartalone Eastern Michigan University GL0349733	***Pilot Assumptions*** Kary Lucas Amway Corporation GL0349734	***What Kind of Pilot Runs Out of Gas?*** Mike Adams Marcie Veronie Avemco Insurance GL0349736
Tuesday, July 30	***Runway Incursions and Runway Signage*** Jack Vandeventer FAASTeam Representative GL0349898	***Ditching and Water Survival*** Robert Shafer U.S. Coast Guard Auxiliary GL0349727	***Mountain Flying Tips*** Bill Standerfer ATP / CFI GL0349900	***Approach and Landings—Positive Control*** Jeffery Taylor Wisconsin DOT GL0349901	***Aircraft Upset: The Serial Killer Among Us*** John Dye FAASTeam Representative GL0349903	***Airspace, Airports and Airmanship*** Wanda Zuege CFI / FAASTeam Representative GL0350090
Wednesday, July 31	***Common Problems and Solutions in FAA Medical Certification*** Gregory Pinnell, MD AME, Saginaw, Michigan GL0349905	***FLYING—The Art of Risk Management & Decision Making*** Greg Feith AviationSpeaker.com GL0349906	***The Engine Failure: A Survival Guide*** Lynnwood "Woody" Minar FAASTeam Representative GL0349728	***The Kings on Risk Management*** John & Martha King King Schools GL0349908	***Aircraft Owner Maintenance Part 1*** Ric Peri / Craig Johnson Aircraft Electronic Association GL0350091	***Aircraft Owner Maintenance Part 2*** Ric Peri / Craig Johnson Aircraft Electronic Association GL0350092
Thursday, August 1	***Plans for Navigation in Case of a GPS Outage*** Rick Massimini Rick Niles MITRE Corp GL0349910	***NextGen Outreach and Performance*** Gisele Mohler Director NextGen Outreach, FAA GL0350093	*FORUM CLOSED* *Meet the Administrator* *EAA Pavilion #7*	***They Don't Crash in Convenient Places*** Greg Feith AviationSpeakers.com GL0349911	***Chart Challenge Live: IFR*** Andy Miller AOPA Air Safety Foundation GL0349912	***Hot Aeromedical Issues!*** Fred Tilton, MD Federal Air Surgeon GL0349914
Friday, August 2	***Interceptor Operations TFRs and You*** Kevin Roethe NORAD Peterson AFB, CO GL0349915	***Defensive Flying*** Rod Machado AviationSpeakers.com GL0349916	***Law Enforcement Use of Unmanned Aircraft Systems*** Alan Frazier University of North Dakota GL0349917	***Approaches That Can Kill—VFR*** Ray Heyde FAASTeam Representative GL0349938	***Approaches That Can Kill—IFR*** Ray Heyde FAASTeam Representative GL0349939	***Flying For a Lifetime*** Andy Miller AOPA Air Safety Foundation GL0349940
Saturday, August 3	***Avoiding Pilot Deviations and Runway Incursions*** Peg Ballou Ballou Skies Aviation GL0349941	***Chart Challenge Live VFR*** Andy Miller AOPA Air Safety Foundation GL0349942	***Beyond Dunker Training, the Real Thing*** Derwin Hammond FAA / CFI GL0349943	***Is Your Airplane Airworthy?*** Larry Bothe Master CFI / DPE GL0349948	***A New Look at In-Flight Emergencies*** Thomas P. Turner FAASTeam Rep GL0349953	***Mechanic and Owner Responsibilities for Maintenance Records*** Terry Michmerhuizen Western Michigan University GL0349954
Sunday, August 4	Aviation Safety Videos Shown All Day Long—Come Join Your Fellow Pilots For a Movie or Two! (Times listed here are approximate start times) **0830—Friendly Flight Paths (GL0350094)** **0905—Fuel Awareness (GL0350095)** **0940—Midair Collision Avoidance (GL0350098)** **1025—Avoiding Spatial Disorientation (GL0350099)** **1105—Tips on Mountain Flying (GL0350100)** **1145—Pilot Operations at Non-Towered Airports (GL0350101)** **1235—Evaluating In-Flight Weather (GL0350102)** **1320—Single Pilot IFR (GL0350103)**					

Appropriate **AMT / WINGS** credit will apply to events by using associated select **#GL0349XXX** listed in each box above.

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FREDERICK E. TILTON, M.D.
FEDERAL AIR SURGEON

What Now?!

IT'S HAPPENED! You're experiencing that in-flight emergency you've always dreaded and you're going to have to set the aircraft down. Endless questions race through your mind. *What do I do first? Where should I land? How long before they even realize I'm missing??*

This issue of *FAA Safety Briefing* focuses on emergency preparedness. In that spirit, here are a few tips from our survival experts that could help you if the worst does happen.

1. Admit that "it *can* happen to me." Denial puts a pilot in the position of being unprepared. If the pilot hasn't thought things out beforehand, necessary decisions are too often "snap" decisions that could lead to critical mistakes.
2. Pack a survival kit. If you don't take care of item 1 (admit it can happen) you will never get to item 2. Take into consideration the terrain you're flying over, number of occupants on board, and the basic items you will need to get rescued.
3. Have the survival kit on your person or tied down near the exit. Once the aircraft has come to a stop, you need to get out as quickly as possible. If the aircraft is burning or sinking, you may not have time to locate a kit in the cargo area (or worse, in an unknown location because it has moved during flight).
4. Establish an opened exit before you touch the ground or water. If the airframe bends or warps during the set-down, it could pin doors and hatches closed, would impeding you from leaving the aircraft in a timely fashion.
5. Evacuate the aircraft and find a "hole-up" site. It should be a safe distance from the aircraft because of the threat of fire, or, in the event of a water landing, being pulled under by a sinking aircraft. As advised in the "Passenger Safety Briefing" sidebar on page 16, brief passengers on a post-evacuation meeting point (for example: "Let's gather 100 yards behind the tail").
6. Account for all crewmembers. It seems simple, but with adrenaline levels high, it can be surprisingly easy to overlook a missing person. The missing person could be injured, in shock, or simply lost.
7. Treat injuries. Do the best you can. With medical supplies likely to be limited, you may have to improvise. This is where training makes a difference. CPR training, basic first responder skills, and survival medicine courses will obviously help.
8. Establish a camp. Find a suitable site that will offer some natural protection from the elements. In the cold, you will want to find protection from the wind and damp. In a hot and/or arid environment, you will want to get out of the direct sunlight.
9. DON'T WANDER! One of the biggest mistakes a person makes while trying to survive is going to look for help. Do you know where you are? Do you know where you're going? Are you injured? Is your clothing adequate to protect you from the accident environment? Remember, rescue parties are primarily looking for the downed aircraft, which is far easier to spot than a lone individual. Your chances of being located and rescued are much greater if you are in the vicinity of the wreckage. If you are in a life raft, deploy your sea anchor to keep it near the area where the aircraft went down.
10. Start a fire. Fire is a survivor's best friend. It gives protection and warmth. It also serves as a signal and offers a sense of security. Be aware that starting a fire is a little tougher than most people realize. It isn't as simple as putting a match to wood; on the contrary, fire-starting is a skill that requires some training and practice.
11. Establish a distress signal. If you have started a fire, then you have one signal already going. Ballistic flares, smoke generators, electronic types (including cell phones), and reflectors should be ready and easily reachable. There may be a very small window of opportunity to get someone's attention.
12. Drink water. The average human in a typical household setting needs between two and four quarts of water every 24 hours. In a survival environment, this number may go way up. The water you took from the aircraft may be all you have. Remember that the days of rationing water are long gone. The new thinking is to ration your sweat, but not your water. That means that you should use your body as a canteen by drinking as much as you can whenever you can, and control your perspiration (i.e., avoid dehydration). There are several survival techniques that will help you find, sanitize, and conserve precious fluids.

Frederick Tilton, M.D., M.P.H., received both an M.S. and an M.D. degree from the University of New Mexico and an M.P.H. from the University of Texas. During a 26-year career with the U.S. Air Force, Tilton logged more than 4,000 hours as a command pilot and senior flight surgeon flying a variety of aircraft. He currently flies the Cessna Citation 560 XL.

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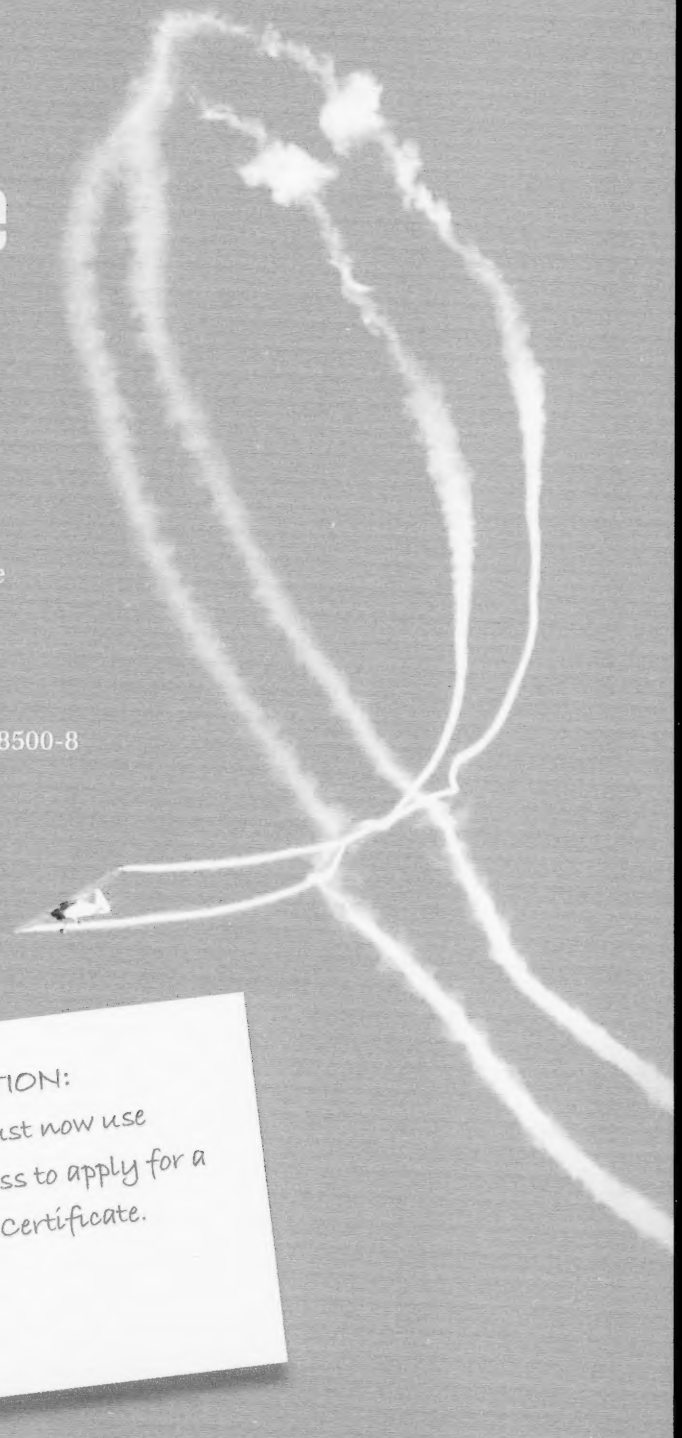

Ask Medical Certification

COURTNEY SCOTT, D.O.
MANAGER, AEROSPACE MEDICAL
CERTIFICATION DIVISION

Q1. My current medical certificate has expired. I submitted an application for a new third-class medical certificate, but my aviation medical examiner (AME) is asking for more documentation of a medical condition I developed recently. May I continue to exercise sport-pilot privileges while this application is being processed?

A1. This is an interesting question. If you had NOT applied for a current examination through the FAA I would be able to say that you could. But since you now have a current examination that is "not issued," you cannot exercise sport-pilot privileges.

Q2. At my last physical, my doctor expressed concern about my high blood pressure reading of 150/90. He told me to exercise more and reduce the amount of salt in my diet. Is this something I need to discuss with my aviation medical examiner (AME) immediately, or can it wait until my next exam?

A2. Part 61.53 clearly states that if an airman develops a known disqualifying medical condition, or begins a known disqualifying medication or treatment, he/she must not fly. Our AMEs are instructed that if an airman comes into their office for a FAA examination and a solitary blood pressure reading is greater than or equal to 155/95 they may not issue a medical certificate. At a minimum, you should notify the FAA at your very next medical examination. High blood pressure is a disqualifying medical condition, but you can be granted medical certification, and in this particular condition without an authorization for Special Issuance (waiver). This is because high blood pressure (hypertension) can be treated and most antihypertensive medications are acceptable for flying.

Q3. I heard that the FAA approved new protocols for airmen recovering from certain cardiac events trying to return to flight. What changed? Where can I find this information?

A3. The FAA recently convened a panel of cardiology experts to make recommendations regarding follow-up of certain cardiac events. These included heart attacks (myocardial infarction), bypass surgery, stenting, permanent pacemakers, and requirements for stress and radionuclide testing. In general, shorter wait times have been recommended. These recommendations are still being reviewed at the Federal Air Surgeon's level. As soon as they are approved, they will be disseminated to AMEs and major industry organizations that can help communicate this information to airmen. Most likely they will also be discussed in the Federal Air Surgeon's Bulletin available at http://go.usa.gov/2RgP.

Courtney Scott, D.O., M.P.H., is the Manager of Aerospace Medical Certification Division in Oklahoma City, Okla. He is board certified in aerospace medicine and has extensive practice experience in civilian, and both military and non-military government settings.

Send your questions to SafetyBriefing@faa.gov. We'll forward them to the Aerospace Medical Certification Division without your name and publish the answer in an upcoming issue.

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What Would MacGyver Do?

A Look into Aviation Survival Equipment

SABRINA WOODS

Growing up, I had a passion for action television shows. *Knight Rider, The A-Team, Quantum Leap,* and my favorite, *MacGyver,* were on my weekly list of "must-sees," even if I had to sneak to stay up and watch, unbeknownst to my parents. The excitement, the adventure, and the quick-thinking and problem-solving skills of the shows' protagonists became a foundation for how I wanted to be when I became an adult. Plus, the liberal use of pyrotechnics, high-speed car chases, and bad guys getting their comeuppance always left me eager for more.

I can remember one episode of *MacGyver* in particular, when the title character — just your run-of-the-mill secret agent/scientist/bomb technician/hockey playing super genius — had to lead a group of rebellious teens on a trip into the mountainous wilderness. The intent was to teach the kids some basic survival and teamwork skills, but instead their airplane crashed and the skills they learned would become a matter of life or death.

This brings up the concept of survival and just what it takes to remain alive when things go awry. MacGyver (Mac) always seemed to make it look easy. With his trusty Swiss Army knife, a conveniently placed roll of duct tape, a few household items, and some ingenuity, Mac could fix a blown fuse, manufacture a harpoon, or thwart an enemy advance.

Alas, I have come to face the fact that as an adult, and despite having passed high school chemistry with a "B" average and owning at least four rolls of duct tape, I am no MacGyver. It is entirely likely you aren't either — but even though you may not be a MacGyver, it certainly doesn't hurt to try and *think* like him should a flying mishap occur. So here are a few tips on how to unleash your inner MacGyver.

MacGyver Prepares

MacGyver always prepares for every adventure by gathering information and carefully planning out his route. You should, too. Weather applications, tower personnel, pilot cross-tell, and a good pre-flight can help ready you for what you might encounter while cruising around out there.

Keeping people informed about your plans is always a good idea, too. Does someone know where you are going, when you should be arriving, and the general route you intend to fly? This seems excessive on an ordinary good flying day, but what if something goes wrong and you crash land? The information you have gathered (and left) can become a difference maker.

MacGyver Carries a Pocket Knife

Mac's number one go-to gadget in case of a crisis was his pocket knife. You might want to consider expanding your survival equipment inventory a bit, but having a good sturdy knife is always a great start.

Several companies offer different aviation-specific survival kits, but what you really need to focus on is acquiring equipment pertinent to the environment you typically fly in. For example, having life vests might not be necessary over the deserts of southern Arizona, but over the Florida Everglades it's an excellent idea. Just recently, life vests were credited for helping to save the lives of a couple who had to ditch their craft in the frigid waters of the Hudson River.

And while on the subject of cold climates, the colder the weather, the more likely you are to succumb to hypothermia should you land in it. Flying in these conditions should encourage you to keep some sort of fire-producing equipment onboard (e.g., waterproof matches or a flint). Thermal blankets and heat packs can help keep the body warm, and the former can function as a shelter if required.

Conversely, if flying in dry, arid climates, having water and sunscreen is paramount and even something as simple as a ball cap or sunglasses can go a long way in providing protection from the elements.

If you fly in heavily vegetated areas, a good bug repellent or a bit of mosquito netting could be useful in keeping the critters — particularly those whose bites can be venomous or lead to infection — at bay.

Some basic, all-climate gear to have include: a good flashlight, a first aid kit, a small cache of non-perishable food, water, a crash axe, and some nylon parachute cord. And then there is that duct tape. Mentioned with humor earlier, this wonderfully sticky, fairly waterproof, and deceptively strong stuff is actually a really great tool to have onboard in case of emergency. Check out the sidebar for a more comprehensive list of what you might want to consider packing in when you fly.

Having the equipment is one thing. However Mark Spencer, Vice President of the Arizona Pilots Association and a state liaison to the Recreational Aviation Foundation, admits that "many a pilot has been left stranded with all his or her emergency equipment stuck in a burning or sinking aircraft." He suggests being prepared to make it out with only what you have on your person, and to consider wearing a fishing vest — the type with lots of pockets — and load it up with some survival items every time you fly.

MacGyver Gets Rescued

The whole point of surviving is to get rescued and get back home. There are a number of items that can help immensely with this goal. Easy-to-use, low-tech gadgets such as signal mirrors, flares, or a signal whistle come standard in most kits. Triangulation and global positioning satellite (GPS) devices have also become pretty commonplace, and having a piece of equipment with this capability can be a real lifesaver.

An emergency locator transmitter (ELT) in your aircraft is designed to transmit a distress signal in the event of an accident. You can learn more about this technology from the article on page 19 of this edition of *FAA Safety Briefing*. This works well unless extenuating circumstances separate you from your aircraft. In that case, a personal locator beacon might serve you better as it is far more portable and can be taken with you should you need to vacate the premises. It works much the same as the ELT and emits a distress signal for potential rescuers to pick up.

Lastly, your cell phone can prove to be an invaluable source for tracking you down, and not just in the obvious way by calling for help. Rescuers can narrow down a search area by using either multilateration — finding a "fix" on the cell phone signal by measuring the distances between two towers that are picking it up — or by the GPS that often comes standard with smartphone technology.

Some basic, all-climate gear to have include: a good flashlight, a first aid kit, a small cache of non-perishable food, water, a crash axe, and some nylon parachute cord.

Whether you choose low-tech or the higher end stuff to outfit your survival gear, the best chance of getting back home is by giving search and rescue personnel an idea of where to start. Even when on the most covert missions, someone — usually his boss, Pete — would know where MacGyver was heading, so if he went off the radar for too long, his buddies had a good idea of where to look. You should give yourself this advantage as well. While filing a flight plan is not compulsory, it is a darn good idea. As mentioned earlier, it gives someone an idea of where you were going, when you should arrive, and the path you intended to travel. This information, combined with a locator device of some sort, dramatically increases your chances of being found.

MacGyver Has a Good Attitude and is Trained

Although fictional, the character MacGyver, and the optimism and tenacity he exuded, likely ensured his own survival even more than the fancy gadgets and pyrotechnics. His seemingly never-ending ability to make the best of bad situations embodies the American fighting spirit. So much so that words like "MacGyvering" or "to MacGyver" have become an integral part of our pop culture lexicon. They mean to

A thermal blanket can help to reduce heat loss in emergencies.

use ingenuity to fix or remedy a problem using only the available tools at hand.

Throughout the course of the show, whenever MacGyver was cheerfully jury-rigging a catapult or making a smoke screen out of vinegar and baking soda, he always took the time to narrate how he learned the trick or explain his rationale for attempting it. The bottom line here is that there is no substitute for experience and training.

The Civil Aerospace Medical Institute (CAMI), the FAA's medical certification, research, and education wing in the Office of Aerospace Medicine, maintains a host of airman education programs dealing in everything from aviation physiology to post-crash survival courses. In addition, CAMI offers a free one-day survival course. This course is very hands-on and will address all the checklist items above, as well as give guidance and suggestions for packing a personal survival kit. If you are interested in attending, please contact the Airman Education Program staff at (405) 954-4837, or you can learn more at http://www.faa.gov/pilots/training/airman_education/aerospace_physiology/. Consider investing some time in one (or more) of the courses because the more knowledge you gain, the better equipped you'll be during an emergency.

While you might not be a multi-lingual, globe-trotting, physicist/engineer, with a good attitude, some training, a little preparedness, and a few specialty pieces of equipment, you can certainly survive like one.

Sabrina Woods is an assistant editor for FAA Safety Briefing. *She spent 12 years in the active duty Air Force where she served as an aircraft maintenance officer and an aviation mishap investigator.*

A Comprehensive List of Aviation Survival Equipment

The Essentials

- signal mirror/whistle
- knife (fixed, 4+ inches)
- compass
- waterproof matches/flint
- tinder
- battery flashlight with extra batteries
- insect repellant
- first aid kit:
  - gauze, bandages, hemostatic agent, ibuprofen, disinfectant, prescriptions
- sealed water/non-perishable food
- duct tape
- nylon rope
- water purification tablets
- crash axe
- heavy duty backpack (waterproof)
- work gloves
- survival manual
- cell phone

Cold/Wet Weather Care

- Mylar (thermal) blanket
- light poncho
- chemical hand/foot warmer
- life vests/raft
- warm gloves/hat
- water-activated strobe lights
- dye marker

Hot Weather Health

- sunscreen
- cap/visor
- sunglasses
- WATER!

Nice to Have

- waterproof pen/paper
- sewing kit
- survival candle
- toilet paper
- personal locator device
- glow sticks
- flares
- mosquito netting
- fishing set
- safety pins
- pocket chain saw
- multi-tool
- zip ties
- fire gel

STEVE SPARKS

Defensive Flying

Being Prepared for the Unexpected

Much like defensive driving, defensive flying involves staying one step ahead of the curve when it comes to safety. As we drive to the airport in preparation for an upcoming flight, we are bombarded with opportunities to exercise defensive driving skills and elude potential danger. Most of us have experienced situations involving drivers who exceed speed limits, text while driving, ignore traffic signals, or fail to pay attention — period. In a similar way, navigating an aircraft — on taxiways and in airways — can be quite challenging. It's a jungle out there!

The principle behind defensive flying is to never assume that other pilots, air traffic controllers, ground personnel, or even Mother Nature are looking out for your safety. Because pilots are human, we often get trapped in our own tiny universe and forget to consider the bigger picture. In certain cases, we have to defend against our own miscalculating and complacent ways to prevent events that could lead even the most experienced aviators down the wrong path. However, with a proper plan and good situational awareness, you'll be much better prepared for the various factors that can adversely affect aviation safety.

Proper Preparation

As with any complicated task, mental preparation plays a key role in successfully flying an aircraft. It may be a cliché, but when it comes to aviation, it is certainly true that what you get out of it depends on what you put into it. Whether a particular flight involves training, a cross-country, or a practical test, the amount of preparation is usually reflected in the overall results. It's always better to over prepare for a flight than to be caught off-guard and be surprised by the unexpected. These situations are no fun for any pilot or passenger.

A great habit before any flight is to mentally rehearse the event from start to finish. Think through the flight as planned, but develop contingencies should the flight have to change due to weather, mechanical problems, or other unforeseen conditions. It's much easier to execute a well-thought-out contingency plan than it is to make radical decisions during flight. Prior planning eliminates a lot of pressure from pilots and can increase safety exponentially.

Another advantage of a pre-constructed alternative flight plan is that it allows the pilot to make small adjustments as opposed to reacting to circumstances that could have been mitigated from the very start. Pilots who approach flying activities using a defensive mentality often experience greater satisfaction knowing they have thought through various safety options beforehand and haven't left much to chance. Well-thought-out tasks that have been prepared for on the ground often yield positive results when decisively executed in flight.

Mental Preparation Before Takeoff

Good mental preparation before any takeoff should always be of high priority for the pilot-in-command (PIC). Too often, pilots don't think enough about preparing for the unexpected during the takeoff and initial climb segments of the flight. Whether it's the first takeoff of the day or the tenth, a lot can go wrong if the pilot isn't expecting the unexpected.

An excellent way to prepare for any surprises on takeoff is to develop a mindset of expectation: Before each takeoff, mentally tell yourself that "today is the day that I'm going to have an engine failure or an unusual occurrence on takeoff." Though it might sound overly pessimistic, this mental exercise can reduce the chance of being caught off guard. Whether flying solo or with passengers, pilots who perform this mental rehearsal can shave precious seconds off response times when reacting to unusual events during takeoff. Research reveals that it can take as much as seven to eight seconds for pilots to properly respond to a startling/unexpected event in the cockpit. Simply put, performing these "what if" scenarios can help train the mind to respond positively in less time.

Checklists, SOPs, and Discipline

The use of approved checklists and standard operating procedures (SOPs) while maintaining professional discipline can influence a pilot's ability to handle unusual circumstances in the cockpit. As stated in Title 14 Code of Federal Regulations (14 CFR) section 91.103, pilots are required to be aware of all available information in connection with any given flight. Taking this rule seriously means hitting every listed item and primes the pilot to be aware of all available resources. Such awareness can increase safety and improve overall enjoyment of the flight — which is, after all, why we fly.

SOPs can help prevent unfortunate circumstances from occurring by preparing pilots to handle both normal and abnormal events. Many pilots believe SOPs exist only for crew members flying large aircraft involving part 121 and 135 operations. Wrong! Every pilot should develop and implement SOPs for all flight operations, regardless of the type of operation being conducted. SOPs add structure and an enhanced level of safety by helping the pilot implement best practices and techniques applicable to many situations.

Appropriate checklist usage is another resource pilots can use to deal with abnormal and emergency situations in the cockpit. Unfortunately, many pilots allow the habit of using a checklist to fade over time. Remember, though, that appropriate checklist usage is a resource available for improving performance and enhancing safety. Even if you fly the same aircraft all the time, use the checklist because complacency kills.

What Did I Miss?

Since most instrument approaches end with a successful landing, many pilots are often caught by surprise when having to fly the missed approach procedure. If not properly prepared for or briefed, going missed can be a highly complex and challenging event.

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Preflight planning contributes to your overall preparation for a flight.

Having a false sense of security on an instrument approach can lead to disastrous results. Because missed approach procedures are executed close to the ground at low airspeed pilots can rapidly become task saturated in "dirty" aircraft configurations. Pilots who are mentally prepared and physically triggered to fly the missed approach prior to starting the procedure are much more likely to execute it successfully.

The use of approved checklists and SOPs can influence a pilot's ability to handle unusual circumstances.

Preparation from Beginning to End

Preparation is a key ingredient for successful flying. Proper pre-flight planning and good mental preparation pay huge dividends for pilots who take into consideration the expected and unexpected circumstances that might influence the safety of each flight.

The principle behind defensive flying is to never assume other pilots, air traffic controllers, ground personnel, or even Mother Nature is looking out for your safety.

As with most plans, flight plans are likely to change on a near-constant basis. It is thus incumbent upon the pilot to develop every flight plan with contingency and flexibility in mind. Thorough preparation provides a solid foundation for safety and professionalism. Safety starts before we get into our aircraft and ends only when we've secured it after landing.

Dr. Steve Sparks is an aviation safety inspector at the Wichita FSDO specializing in part 141 flight schools, human factors, helicopter operations, and educational outreach initiatives. He is a certificated flight instructor for both airplanes and helicopters.

SUSAN PARSON

S*A*F*E*T*Y

A GA Pilot's Guide to the Passenger Briefing

You are no doubt familiar with the passenger briefings you hear on airliners, and you know that the regulations — 14 CFR section 91.107 — require you to brief your passengers on how to fasten and unfasten seat belts and (if installed) safety harnesses. That's important, but have you ever stopped to think about what else the passenger briefing in a general aviation aircraft should include? Here's a passenger briefing checklist literally built on S*A*F*E*T*Y:

Seatbelts

Regulations give the pilot in command (PIC) two specific tasks with regard to seatbelts and shoulder harnesses. The first is to brief passengers on how the seatbelts work. The second is to notify passengers when seatbelts must be fastened.

It is also a good idea to explain how to adjust and lock the seat position. This discussion is especially important for the passenger in the right front seat. Imagine how startling (not to mention dangerous) it would be if an un-briefed and unsecured passenger reacted to sudden rearward seat travel by instinctively grabbing the yoke.

Air

Show passengers where the air vents are located, and tell them how to open and close overhead and/or floor-level vents in their seating area. Just a note: unless they have some experience in GA aircraft, it may be best for them to let you make the adjustment.

The subject of air brings up a more delicate issue — airsickness. Some pilots advocate a full briefing on the location of airsickness bags. Others believe that triggers the power of suggestion in potentially queasy passengers. If you are in the "don't tell" group, instruct passengers to tell you right away if they feel uncomfortable for any reason.

Fire Extinguisher

A well-briefed passenger could be very helpful if you find yourself fighting flames during any part of the flight. If you have a fire extinguisher on board — you do, right? — show passengers where it is located, how to unlatch it, and how to use it in the event of a fire.

Exit, Emergencies, & Equipment

Before you talk about exit procedures, show your passengers how to properly secure the door(s) — no one needs the distraction of a door opening in flight. *Then* talk about how to open the door(s) in the event of an emergency evacuation. If your aircraft has doors on both sides of the fuselage, plan and brief which of the front seats should initially remain forward so rear seat passengers can evacuate. Finally, designate a gathering point once evacuation is complete.

Point out survival equipment, and consider designating someone to be in charge of carrying it out of the aircraft if safety permits. Finally, be sure to explain any equipment, such as supplemental oxygen, that passengers are expected to use during the flight.

Traffic & Talking

Brief passengers to speak up whenever they spot other aircraft. A simple "airplane on the right" will suffice, but consider teaching them to give you traffic information in terms of the "o'clock" positions used by ATC. The advantage of this option is that passengers listening to ATC communications will have a better idea where to look when you get a traffic call.

Expectations for communications — talking — is another good topic to include in your passenger briefing. Passengers may not readily understand the term "sterile cockpit," but they will certainly understand that there are times when you need to focus fully on flying. Let passengers know they should not attempt to talk to you (except for traffic point-outs) during busier phases of the flight.

Your Questions

It is both professional and polite to give passengers an opportunity to ask questions about any part of the flight. Since some passengers may be intimidated by the novelty of GA flying or embarrassed to ask "dumb" questions, watch for any signs of confusion or concern. Make a special effort to invite questions needed to clarify any part of the briefing they did not understand. Remember that the question time is a great opportunity to reassure a reluctant rider, or to encourage a potential future pilot's interest in aviation.

Susan Parson (susan.parson@faa.gov, or @avi8rix for Twitter fans) is editor of FAA Safety Briefing. *She is an active general aviation pilot and flight instructor.*

Learn More

FAA Aviation News – Jan/Feb 2007 (p. 10)
www.faa.gov/news/safety_briefing/2007/

Photo by Susan Parson

A seat belt is a major piece of safety equipment that often gets overlooked.

Beyond the Checklist:

Little Things that Can Make a Big Difference in Your Safety

BY MIKE SCHWARTZ

Because so many accidents involve some form of human error, there is an understandable emphasis on strategies to eliminate or mitigate hazards that can lead to such mistakes. Even the most casual reader of publications such as *FAA Safety Briefing* will be familiar with tools like the IMSAFE checklist: Am I free from **I**llness, **M**edication, **S**tress, **A**lcohol, **F**atigue, or **E**ating deficiencies that could affect my physical or mental capacity to operate safely as pilot-in-command? You probably know about the PAVE checklist that encourages a structured review of **P**ilot, **A**ircraft, en**V**ironment, and **E**xternal pressures.

Thankfully, mechanical problems are a far less common cause of accidents than they were in the early days of aviation. Safety and reliability are built into the design of today's certificated production aircraft, and we all benefit from these improvements. In addition, proper and consistent use of a checklist for all phases of flight is now an integral part of aviation safety culture. As an instructor, one of my goals is to make sure that each pilot I train understands the importance of checklist use that starts with the preflight inspection and ends with a postflight review to ensure that the aircraft is properly shut down and securely tied down.

You've probably noticed that today's manufacturer-produced checklists include considerable detail. While I would agree that they cover all of the major items and even some of the not-so-major things to check, I think it's important for safety-minded pilots to consider and periodically review a few beyond-the-official-checklist items that can contribute to your safety and well-being. Let's take a look.

Restraints - Are They Up to the Job?

You know that your responsibilities as PIC include briefing passengers on the use of safety restraints such as seatbelts and shoulder harnesses (*see sidebar on page 16 for tips on giving a good passenger safety briefing*). Lap belts and shoulder harnesses are vitally important in reducing injuries in the event of an accident. But let's take a step back and consider whether those restraints are up to the task you expect them to do. As part of your preflight, you should:

- Check the safety restraints for cut or worn edges, damaged stitching, or excessive wear or chafing to the webbing. Worn or frayed webbing may still be serviceable — but you should check with the seatbelt and shoulder harness manufacturer to find out the limitations for your specific installation. Any webbing that is cut or torn on the edge, however, should be replaced.
- Inspect lap belts and shoulder harnesses for frayed straps.
- Check the inertia reels for proper operation.
- Verify that restraints have the appropriate tags and markings. Most safety equipment intended for aircraft installation, including lap belts and shoulder harnesses, has to meet a national set of standards known as technical standard orders (TSOs). Your restraints should have a cloth tag or metal identification plate stating

that they conform to the TSO requirements. Missing TSO tags are another reason to replace the belts.

- Passengers appreciate cleanliness, so you will want to sanitize safety restraints from time to time. A simple solution of mild soap and water applied with a soft brush will do the trick. Dry the belts in an area where there is good airflow. Never use heat, which could deform the webbing.

Airbags - Will They Work If You Need Them?

Airbags have now become standard equipment in automobiles, and this technology is now finding its way into aviation. As with the highway version, the airway edition of the airbag can quickly become part of the background. Even though aviation airbags are more obvious since they are embedded in the lap and shoulder restraint system, you probably don't even notice them on a day-to-day basis.

You need to leave the inspection and servicing of airbag systems to qualified maintenance technicians – even if it were legal (and it's not), it's not a good idea for a novice to tinker around with initiator devices and compressed gas cylinders and other dangerous parts of this potentially lifesaving technology. What you do need to know is that these components have life limitations, and they also trigger inspection and maintenance requirements.

It's important for safety-minded pilots to consider and periodically review a few beyond-the-official-checklist items that can contribute to your safety and well-being.

Fire Extinguishers - Do You Know How to Use Them?

The next area for focus — fire extinguishers — is a critical one. I truly hope you will never have to deal with combustion that is not confined to the engine compartment, but I also hope you are prepared for that particular emergency. First, you should ensure that your aircraft is equipped with a fire extinguisher that is appropriate for aviation use. The fire extinguisher should be securely mounted in a convenient location, such as brackets between the two front seats. It should be mounted in a way that keeps it tightly in place, but allows for quick release if you should ever need it.

Next, you need to check the operational condition of the extinguisher. Does your preflight checklist include checking the fire extinguisher's status in terms of proper charge and date of service? Has it been inspected at the appropriate intervals? Dry chemical fire extinguishers, for example, need periodic service to ensure that the chemical agent remains in a powder form (i.e., that it does not clump from the vibrations and temperature variations inherent to aircraft operations).

Last, but certainly not least, do you know how to quickly release the fire extinguisher from its mount and activate it? You may not have time to read the fine print directions if ever you need the services of a fire extinguisher. Get familiar with how it operates and how to protect the occupants of the aircraft from the effects of discharging a fire extinguisher (e.g., do you need to ventilate the cabin?)

Options - Do You Need More Gear?

Depending on what you fly, you might want to consider using a helmet. Some aircraft manufacturers recommend using helmets during certain aircraft and rotorcraft operations. Helmets can improve a pilot's ability to hear radio communications by reducing outside noise. More importantly, they can prevent a head injury in the event of an accident or incident. If you do use a helmet, consider keeping the visor down during flight in order to protect your eyes in the event of bird strike or windscreen damage. Naturally, you'll want to clean the visor periodically to remove foreign debris, and replace it if it becomes scratched.

If you operate over water, or in remote areas, consider flotation devices and/or first aid equipment. Life vests have requirements for inspections and testing, so they should be checked periodically to ensure they are still within serviceable time limits. The same is true of first aid kits. Check to make sure the contents have not exceeded life limits, and replace items that are out of date.

Mistakes or safety gaps, no matter how small, can cost lives. Therefore every gap is worth investigating.

Mike Schwartz is an Aviation Safety Inspector with the FAA's General Aviation and Commercial Division. He is an airline transport pilot, active flight instructor, and an Airframe and Powerplant mechanic.

Learn More

FAA Brochure on Shoulder Harness Safety
http://go.usa.gov/bQQj

FAA Information for Operators (InFO) – Safety in Part 137 Agricultural Operations
http://go.usa.gov/bQQ5

Photo courtesy of Pointer, Inc.

Distressed Over Emergency Beacons?

Know How to 'Save' Yourself

BY PAUL CIANCIOLO

It's not always the crash that kills; sometimes it's the wait to be rescued. One way to reduce the time it takes help to arrive is to ensure that your aircraft has an emergency locator transmitter (ELT) properly installed and working. Congress mandated that all airplanes carry an automated distress beacon after two U.S. congressmen disappeared in a Cessna aircraft over the Alaskan wilderness in 1972 and several other searches that had negative press coverage. One such story was published in the *New Yorker* magazine after a little girl survived a crash that killed her parents. She kept a diary over several days noting what ended up being search planes flying overhead that could unfortunately not see the crashed aircraft through the dense trees. She died before she was located. If the aircraft had an ELT transmitting a distress signal, she could have been rescued in time.

To review, there are two types of automated emergency beacons for aircraft — digital and analog.

Digital ELTs

The National Oceanic and Atmospheric Administration (NOAA) operates satellites in orbit that can detect a distress signal transmitted over the 406 megahertz (MHz) radio frequency, which is a digital radio frequency comprising 19 channels. ELTs, PLBs (personal locator beacons), and EPIRBs

(emergency position indicating radio beacons for maritime use) all transmit a data burst when manually or automatically activated. The data may include specific GPS coordinates if the beacon is equipped with an optional GPS receiver, and under ideal circumstances, those coordinates could be within 100 yards of the activated beacon. The accuracy of the standard 406 MHz beacon is 2-3 nautical miles (go to www.sarsat.noaa.gov for more about NOAA and its search and rescue satellites).

When NOAA's mission control center picks up a distress signal on 406 MHz, it's relayed to the Air Force Rescue Coordination Center if detected in the continental United States, the Alaska Rescue Coordination Center if in Alaska, or the Coast Guard if on the water, the latter of which also includes Hawaii, Puerto Rico, and the U.S. Virgin Islands. Their first response action is to call the owner of the beacon. However, that can be difficult if the owner has not registered the beacon.

Please call immediately for accidental ELT activation.

Rescue Coordination Centers

Air Force: 1-800-851-3051
Alaska: 1-800-420-7230
Coast Guard: 1-855-406-8724

If you have not already done so, please register your 406 MHz ELT online at www.beaconregistration.noaa.gov. It may save your life! And if your information changes, be sure to update it with NOAA so authorities don't have to waste time chasing down new leads.

If contact cannot be made with the owner, search and rescue resources are deployed. The ELT also transmits a low-powered analog homing signal on 121.5 MHz that searchers can use once they get to the general area that the satellites have triangulated. All digital ELTs are required by the FAA to have this homing signal when flying in the United States. Be aware, though, that some foreign manufacturers sell ELTs without this FAA-required option.

Never test your digital 406 MHz ELT by activating it, even for a second. Unlike the 121.5 ELTs you are familiar with, these types of beacons have a self-test mode to ensure proper operation. Follow manufacturer instructions. If a live test is absolutely necessary, you must contact the appropriate rescue coordination center first. Due to bandwidth limitations and memory capacity onboard the satellites, live testing could bump a real distress signal message to make room in its memory before a ground station picks it up.

Analog ELTs

Still authorized for use — in aircraft only — are analog 121.5 MHz ELTs. These were monitored by NOAA satellites until 2009. The distress signal is sent through amplitude modulation of the 121.5 MHz radio frequency.

In order for an analog ELT signal to lead to a rescue, it must be heard and reported to the appropriate rescue coordination center. Most air traffic control towers, flight service stations, Civil Air Patrol aircraft, and many commercial airliners monitor 121.5. If you hear a distress signal (listen to an example at http://bit.ly/15F13tl), please contact the nearest air traffic facility to report your altitude, the location you first and last heard the signal, and where the signal was strongest.

Do your part for the general aviation community and listen to 121.5 when airborne, and listen again prior to shutting down your aircraft to ensure that your own ELT is not going off after that rough landing. If you would like to test your own analog ELT, you may do so during the first five minutes of every hour by activating it for no longer than three audible sweeps. To hear those sweeps and verify

Photo courtesy of ARC/ARTEX Products

that it is working, tune your radio to 121.5 and listen. Remember that this type of test is only authorized for analog ELTs that transmit on 121.5 MHz.

The 121.5 MHz international air distress frequency — also known as "guard" — may be used by any aircraft in distress or for voice communications in an emergency situation. Air traffic controllers sometimes use guard to warn aircraft away from restricted or prohibited airspace. And, of course, this frequency is the one that intercepting air defense aircraft will use to ask for identification or provide specific instructions to aircraft whose pilots have strayed into restricted airspace.

The frequency can get pretty busy. Even TVs and computers like to "talk" over guard — go to http://bit.ly/13VF01X to see a video demonstration of an Apple computer transmitting a distress call through amplitude modulation of 121.5 MHz. That said, however, please don't tune it out. Listen and report. Someone may be transmitting an actual call for help, or you may need to reply to that F-16 flying off your wingtip.

Photo by Tom Hoffmann

Commercial Tracking

Even if your aircraft does not require an ELT according to 14 CFR section 91.207 (e.g., single seat, experimental, helicopter, glider, powered-parachute, or training within 50 nautical miles of home airport), carrying a portable ELT, PLB, or commercial GPS tracking system is still strongly recommended.

A PLB is free to use, transmits on the same frequency as a digital ELT, and is user-activated. However, commercial tracking systems like SPOT or Spidertracks work in the opposite way of an ELT/PLB. A tracking device uses GPS satellites to determine its location, and then sends that data through a commercial satellite constellation — on average every 2-10 minutes — to a corporate monitoring center. When the signal stops or the emergency button is pressed, an alert will be sent and rescue personnel will be called according to predetermined user agreements established through a paid subscription.

A commercial system is never a substitute when an ELT is required, but it's a great addition to aid in your rescue if needed. In addition, it gives family members the option to follow along from home.

If you plan to be rescued, it's a good idea to file a flight plan, and also to let someone know where you are going and when you will be back. And nowadays, it doesn't hurt to check in or leave a review on social media sites when on the ground, which will aid searchers should you go missing later.

According to the Civil Air Patrol, an average of 75 percent of actual "saves" from conducting missing aircraft searches did not have an ELT detected by search and rescue satellites to initiate the search mission. These were simply aircraft that were reported as missing because they did not turn up where they were supposed to be. This average hasn't changed even with the switch from analog to digital distress signal satellite detection. But since an ELT can only help, do yourself a favor and increase the chances of a rescue team getting to you in time — ensure that you have an ELT installed and functioning properly. And if you are looking to upgrade your old analog ELT, consider a new GPS-enabled 406 MHz beacon that alerts authorities faster and more accurately; it's well worth the cost should you have an accident and need help.

Paul Cianciolo is an assistant editor and the social media lead for FAA Safety Briefing. He is a U.S. Air Force veteran, and a rated aircrew member and search and rescue team leader with the Civil Air Patrol.

Learn More

Title 14 CFR section 91.207 – ELTs
http://go.usa.gov/TJne

Aeronautical Information Manual (AIM) chapter 6, section 2-5 – ELTs
http://go.usa.gov/TJQ5

Photo by Jon Ross

Busting Bravo

A Lesson Learned by a CFI

(Editor's Note: A reader who wanted to share his Class B learning experience related this story to the FAA Safety Briefing *editorial staff)*

One showery morning in August 2012, a CFI was conducting a cross country flight, departing with his student from Honolulu International Airport. They were given the Shoreline Departure and told to resume their own navigation just before passing Diamond Head, a volcanic landmark to the southeast of the airport. Because they had filed Koko Head as one of their waypoints, they went direct to Koko Head. Before reaching that waypoint, they were told to squawk VFR. They did so and continued to fly towards and eventually directly over Koko Head.

At that point, the CFI set the 093 degree radial off Koko Head in Nav 1 (which had passed a check at a VOR test facility within 30 days). The 093 degree radial is also the V-15 airway and is displayed on the Hawaii VFR sectional as north of the Honolulu Class B airspace. They flew with a Nav 1 needle deflection within half a dot and continued until they approached the west shoreline of Molokai. They then proceeded direct to La'au point, and from there continued to their destination.

At home several hours later, the CFI was informed that they had violated the Class Bravo. You can imagine he found that to be quite a shock, as he thought he had done everything within the capability of his airplane to avoid the airspace. However, after spending time to reflect, he began to realize there was more he could have done.

His 1,500 hours of experience of flying in and around the Honolulu Class Bravo and his familiarity with VOR navigation proved insufficient to avoid a Class B violation on this particular day. He could (and should) have used both VORs available to him, and he could (and should) have chosen a Koko Head radial that was farther north (i.e., away from the further 2000-foot floor of the Class Bravo shelf). Tracking the 060 radial off of the Koko Head VOR would have given this flight a larger margin for protection from error. In addition, they had access to a VFR-only GPS with distance readouts they could have used for added situational awareness.

Another way to avoid this mistake would have involved requesting flight-following with air traffic control. In this situation, ATC had told them, "You are leaving Class Bravo airspace, squawk VFR, frequency change approved." If they had stayed with the controller, they definitely would not have reentered Class Bravo without permission since they would have been coordinating their navigation with the controller. At the very least, they should have continued to monitor the frequency.

The CFI found out later that the controller had been trying to get their attention, and that they might have been able to avoid a violation simply by listening to the warnings. Instead, the CFI was busy with his student, trying to impress upon him the importance of opening the flight plan with flight service. They had been speaking with flight service instead of maintaining radio contact with departure control.

Prior to this event, the CFI always had heightened awareness in and around the HNL Class Bravo airspace. He was always very careful to avoid the shelves and very focused on violation avoidance. Now, of course, he is even more acutely aware of the safety implications of a Class Bravo airspace incursion, even if the incursion is "only" to clip one of its far corners. ATC was using the established airspace boundary to maintain aircraft separation. At the time of the incursion, traffic was inbound and they were expecting *all* VFR traffic to remain outside of the defined boundary. By entering the Bravo airspace, this wayward flight forced ATC to vector traffic around them to maintain legal and safe separation.

We tell this story because we are all human — accidents and incidents happen. This experience made the CFI a better pilot and, in turn, a better flight instructor. He had always emphasized the need for clearance into Bravo, the need for two-way radio communication, and the use of a mode C transponder with his students. This experience made him that much more dedicated. Using redundant systems and good cockpit resource management will help you avoid violating the regulations that are intended to keep all aviators safe and out of trouble.

2013 General Aviation Awards

For the past 50 years, the General Aviation Awards program, a cooperative effort between the FAA and more than a dozen industry partners, has recognized aviation professionals for contributions to general aviation in the fields of maintenance, avionics, flight instruction, and safety promotion.

Getting to the top is a real achievement. The selection process starts each September at the Flight Standards District Office (FSDO) level before moving up to the Regional FAA Office level. The national award winners are chosen from the pool of winners at the regional level. And the judges are not easy to impress, as they include previous national winners in each of the categories.

FAA Administrator Huerta will present plaques to these deserving national winners in July during EAA AirVenture 2013 in Oshkosh, Wisc. Included in the prize package for each of the four national winners is an all-expenses-paid trip to Oshkosh to attend the awards presentation and other special GA Awards activities.

And the winners are ...

William "Bill" Fifles – AMT of the Year

Bill holds an Airframe and Powerplant certificate with Inspection Authorization, plus a private pilot certificate. Bill's interest in aviation dates from his childhood, but he didn't become directly employed in aviation until 1992. His AMT career started even later, when he began maintaining DC-3/Super 3/DC-3S aircraft with the Genavco Corporation in 1997. In 2003, Bill was hired as the Director of Maintenance at Kamaka Air, a position he still holds.

Bill led the Kamaka maintenance team, numerous volunteers, and students from nearby Honolulu Community College Aviation Trade School in the restoration and overhaul of N9796N, the Kamaka DC-3S. This project attracted aviation enthusiasts and journalists from around the world and provided students with practical, hands-on airframe and powerplant training. N9796N took to the air in July 2004, and has been flying inter-island cargo runs ever since.

Bill has assisted with TV production work on "Lost" and "The Amazing Race," as well as major motion pictures including "Pearl Harbor," "Outbreak," "Along Came Polly," and "The Rundown." He has also been involved in many other production and photo shoots. Bill is currently rebuilding a 1966 *Citabria*.

Bruce Allan Lundquist – Avionics Technician of the Year

Bruce holds a repairman certificate and an FCC General Radiotelephone License. His interest in radio and electronics began at a young age as he listened to his grandparents' AM/shortwave radio. He soon began building crystal radios and stringing antenna wires all over the backyard, much to the chagrin of his mother. After graduating from high school, Bruce joined the U.S. Air Force and later used the training he received there to enter the aviation electronics industry. In 1982, Bruce landed at Pentastar Aviation, where he worked his way up the ladder to become an Avionics System Specialist. Despite turbulent times endured by the company, including ownership changes, Bruce remains there and is confident he will retire with the company.

Dean W. Eichholz – CFI of the Year

Dean is an independent flight instructor as well as a designated pilot examiner (DPE) and FAA check airman. Dean fell in love with flying while watching the Blue Angels perform when he was in grade school. After graduating from Idaho State University, Dean joined the U.S. Navy pilot program. After leaving the Navy in 1980, he obtained his civilian commercial, instrument, multiengine, and flight instructor certificates and ratings.

Three years later, Dean moved to Soldotna, Alaska, and opened Alaska Flying Network, an FAA part 141 flight school. In 1999, Dean sold the flight school to become an aviation insurance broker and part-time independent CFI. Dean was selected Flight Instructor of the Year for the Alaska Region in 1990 and received a "High Flyer Award" from the FAA in 2000.

Dean's greatest and most rewarding training challenge was instructing a deaf pilot for a seaplane rating in the Piper PA-12. Today, Dean trains and conducts flight checks in various aircraft for Transmountain Aviation, Kenai Aviation Inc., and Talon Air, Inc. He is also employed by Falcon Insurance Agency of Alaska in Soldotna and works with his wife as an aviation insurance broker.

Dean has over 10,000 hours of flight instruction logged and over 18,000 hours of total flight time.

Mark Madden – FAA Safety Team Representative of the Year

Mark is currently a professor of aviation technology in the Aviation Technology Division at the University of Alaska. He has earned the Master CFI accreditation three times. Mark joined the FAASTeam because he wanted to make a real difference in improving aviation safety in Alaska. In this role, Mark has been presenting safety seminars as a Lead Representative for the Anchorage FSDO for several years. He has been the organizer and presenter for all the CFI/DPE workshops (FIRCs) in the Anchorage area for more than four years and has presented CFI-specific seminars since 1999.

Mark earned a bachelor's degree in education in 1973 and a master's degree in Management and Computer Data Management in 1984. He began his aviation education journey by earning an associate degree in Aviation Technology in the pilot entry ab initio airline first officer program at Aims Community College in Greeley, Colorado. He is a veteran of the U.S. Air Force who used the GI Bill and scholarships to help fund his education.

In 1998, Mark began his long tenure with the University of Alaska in Anchorage as a professor of Aviation Technology. He has also been a part-time pilot, instructor, and program developer for Empire Airlines, a FedEx feeder. Mark is an airline transport pilot (ATP) with an airplane multi-engine land rating, and holds commercial privileges for airplane single-engine land and sea. He is also a CFI with airplane single-engine, multi-engine, and instrument ratings as well as an advanced and instrument ground instructor.

Learn More

www.GeneralAviationAwards.org.

SUSAN PARSON

Forewarned is Forearmed

NTSB Safety Alerts Offer Helpful Tips

The National Transportation Safety Board (NTSB) may be best known for its work in investigating major accidents, but it also has responsibility for investigating all aviation accidents — including the 1,500 GA accidents that occur in the United States each year. Concerned by the persistently high fatal GA accident rate, the NTSB has recently increased its focus on GA accident causes and possible mitigations. In June 2012, for example, the Board convened a two-day GA Safety Forum in which a diverse group of government and industry officials explored a variety of GA safety issues. As NTSB Chairman Deborah Hersman noted during that session, "GA is essentially an airline or maintenance operation of one, which puts the responsibility for sound decision making on one person's shoulders."

As part of its own efforts to increase GA safety, the NTSB has recently issued several new Safety Alerts targeted at the most common types of GA accidents. Each Safety Alert is a brief information sheet that focuses on a particular safety hazard and offers practical ways to address the topic. Three of the newly-issued Safety Alerts focus on topics related to some of the most common defining events for fatal GA accidents, and two address risk mitigation. The newest additions to the NTSB Safety Alert set include:

As part of its effort to increase GA safety, the NTSB has recently issued several new Safety Alerts targeted at the most common types of GA accidents.

- *Is Your Aircraft Talking to You? Listen!* Safety Alert SA-021 encourages pilots to pay attention to signs of possible mechanical problems. Few episodes of powerplant or component failure occur without any warning; those not-quite-right indications on engine gauges or instruments may be telling you something vitally important.
- *Reduced Visual References Require Vigilance* Safety Alert SA-020 stresses the need to avoid the often fatal mistake of continued VFR flight into instrument meteorological conditions.
- *Avoid Aerodynamic Stalls at Low Altitude* Safety Alert SA-019 focuses on mitigations for the continuing problem of loss of control in flight, which can occur when the pilot is distracted from the primary task of flying – aviating to maintain control of attitude, airspeed, and altitude.
- *Mechanics: Manage Risks to Ensure Safety* Safety Alert SA-022 includes tips to mitigate the risks involved in aircraft maintenance work. For example, it is extremely important to follow all recommended procedures and, no matter how many times a task has been performed, to always refer to written procedures and checklists.
- *Pilots: Manage Risks to Ensure Safety* Safety Alert SA-023 offers similar advice to pilots. One excellent way for pilots to mitigate risk is to make practical preparations for the possibility of trip diversion or cancellation. Such preparedness makes it much easier to do the right thing in the event of deteriorating weather.

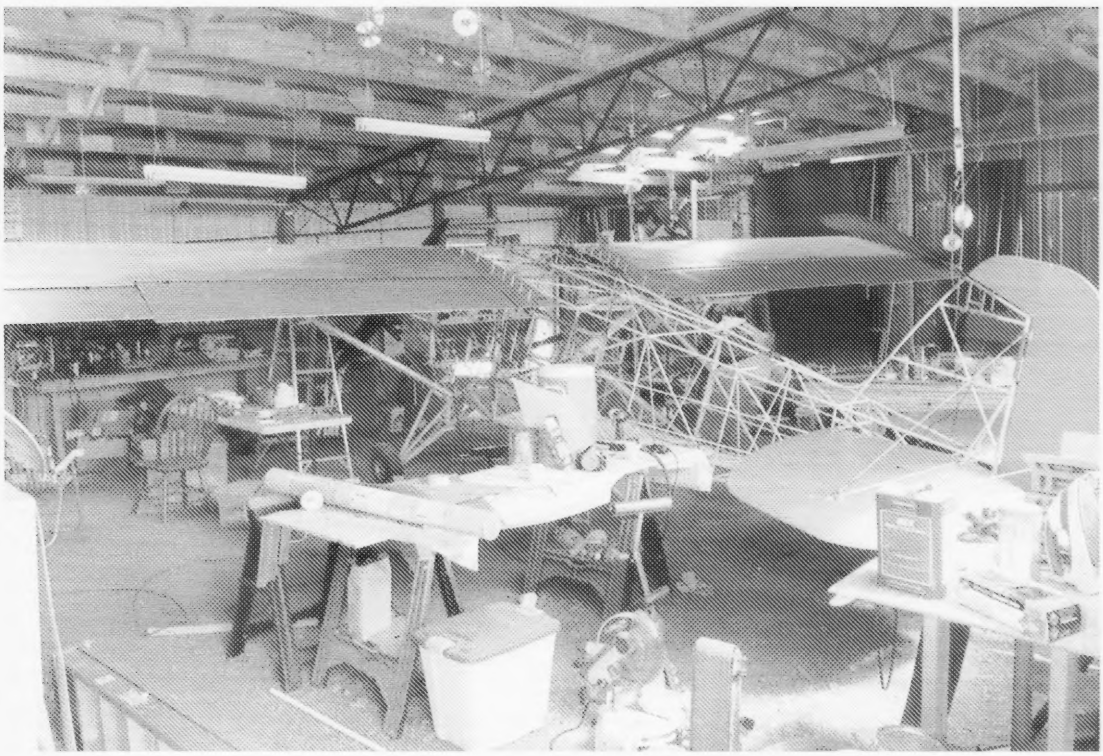
Other topics covered in NTSB Safety Alerts include:

- *Preventing Rote Callouts (SA-018)*
- *In-Cockpit NEXRAD Mosaic Imagery (SA-017)*
- *Aircraft Ground Icing (SA-006)*
- *Thunderstorm Encounters (SA-011)*
- *Controlled Flight Into Terrain in Visual Conditions (SA-013)*
- *Aircraft Inflight Icing (SA-014)*
- *Child Passenger Safety on Aircraft (SA-015)*
- *Meteorological Evaluation Towers (SA-016)*

In addition to creating the five new Safety Alert documents, the NTSB is developing a short video for each one. Plans call for the videos to feature regional air safety investigators sharing their experiences and observations of the many accident investigations they have conducted. These experts will also provide advice on how pilots and mechanics can avoid mistakes that can lead to accidents. To read and/or download NTSB Safety Alerts, please visit: http://go.usa.gov/2BeA.

Susan Parson (susan.parson@faa.gov, or @avi8rix for Twitter fans) is editor of FAA Safety Briefing. *She is an active general aviation pilot and flight instructor.*

Better Hangars and Gardens



Check out the picture above. Study it carefully. Note the appearance — the condition of the floor, the amount of refuse in the area, and the overall accessibility of maintenance items. Does it look a bit like your own hangar? A *lot* like your own hangar? If this picture "feels like home" to you then it is obvious that you do a lot of work in your hangar and that it sees a lot of activity.

Now picture a new client calling to tell you he wants to bring his prized Piper *Tomahawk* with a nose gear problem for you to work on tomorrow. What do you do?

Well, if you are anything like me on the day before I know my mom is coming to visit, you might frantically try to clean the place up. Because, after all, would you want your new client/mother to see you in this truly "natural" state?

Probably not. I wouldn't either. If a picture is worth a thousand words, this one might tell a new costumer that this technician might not be the most organized, and that can be a bad indicator for maintenance practices. Although this might not actually be the case, one never gets a second chance to make a first impression, and unfortunately a bad impression can often be the one that lingers.

While this photo was generously offered as an example of "what not to do" by a experimental/amateur aviation enthusiast and not by an actual contract AMT, if you are starting to feel a little bit guilty of the infractions going on above (food on the work table, tools loose and unaccounted for, messy work surfaces), you might want to read on.

This edition of *FAA Safety Briefing* focuses on "preparedness," and that is definitely a concept that applies to aircraft maintainers. Are you prepared for the new project that could walk through your hangar door at any moment? For that matter, are you adequately prepared for the "old regulars" who rely on you to do their annuals?

Be Prepared

Take a look at your inventory. Really scrutinize it. Have you got everything you need to do even the most basic jobs? Maintaining a ready supply of the most common tools and bench stock used in maintenance can be a real time-saver later when a job comes in. This goes for consumables as well. Lubricants, clean rags, filters, and all those "use-once" items can leave you

stuck if you don't keep a good accounting of what you have on hand before you go to work.

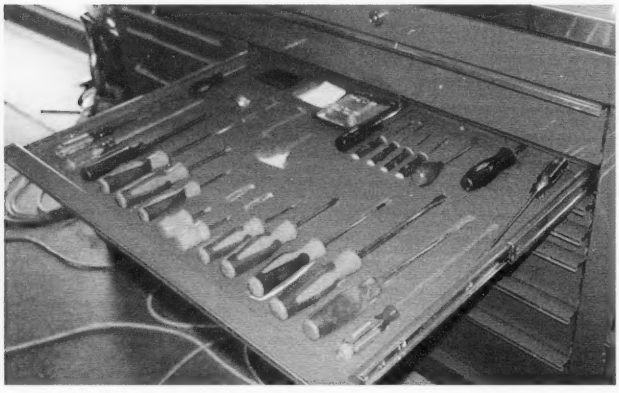
Maintain the appropriate technical data for your regular jobs, and know how to research guidance for aircraft that aren't usually in your purview. This is especially important for aging aircraft. Before you start work on an "old" aircraft, ask the owner for all the data available. Reviewing all of the available data beforehand will help to better expose potential areas of concern and inform you of that aircraft's particular traits and characteristics. Bookmark valuable internet tools such as the FAA aircraft page, found at http://www.faa.gov/aircraft/. This website highlights safety alerts and advisory circulars, warns of unapproved parts in the supply system, and provides repair request forms and equipment listings.

A Tale of Two Toolboxes

As is the case with inventory, how you keep your stock is also a very important part of preparedness. Look at the photos on this page. These are two completely different examples of how to organize (or not) a tool box.

The red tool box looks like the items have been tossed in with no easy way to see whether or not what you are looking for is actually in the box. There is no clear indication as to the functional grouping of the items (clamps vs. screwdrivers vs. motorcycle gears?). Although the items appear to be clean, looking for a tool in this box would be a time consuming, frustrating process. This method of "organizing" could also be costly in the future, as more sensitive equipment, such as torque wrenches that require calibration, can be rattled and knocked around as the drawers are opened and closed.

The blue tool box is a different story. It has been shadowed out and each tool is clean. The entire box is neat and organized by function and size. It would appear that this maintainer takes care of his or her tools, and that accountability is important. This is good: it means a tool is less likely to get "lost" in an aircraft once the maintenance has concluded — a very realistic fear that a lot of aircraft owners have. This method also all but eliminates the "who took my tool?" game — you know, the one you play when you aren't sure if it's really gone or just hidden under a half-eaten turkey sandwich.



Photos by Tom Hoffmann

White Glove Test Not Necessary

It is a given that the act of maintenance in itself can be a messy job, and certainly no one is implying that the typical dirt and grime that go hand in hand with being a mechanic should be (or even could be) completely eliminated. And yes, sometimes there is a little bit of clutter that goes along with a job well done as well. The real trick is to find a good balance between organized chaos, and just chaos.

Assigning larger items (tool kit, work table, bench stock) to a specific "spot" on the hangar floor will go a long way in keeping you organized and will be a time-saver when you are reaching for your equipment. A good thorough cleanup of the truly yucky bits (filthy rags, full drip pans, grimy floor) at the end of the day will help you start the next one on a good note and prevent the panic attack that might come with a "surprise" visit from a client.

Whenever we go someplace where a service is rendered, we have a certain idea of how that place should look and operate. Restaurants should be clean and sanitary. Retails stores should be organized with clearly labeled items. Supply stores should be well stocked. This is true for a good maintenance shop as well. Having a shop that is organized with supplies readily on hand will go a long way in reinforcing the rapport you have with your usual customers, and it might even entice a few new patrons to come through the door.

Sabrina Woods is an assistant editor for FAA Safety Briefing. *She spent 12 years in the active duty Air Force where she served as an aircraft maintenance officer and an aviation mishap investigator.*

TOM HOFFMANN

New GA Safety Outreach Program Begins This Summer

When the General Aviation Joint Steering Committee's (GAJSC) Loss of Control Working Group (LOCWG) published its report on approach and landing accidents last year, a key part of the group's strategy to reduce GA fatal accidents was to focus outreach on a set of specific safety enhancement (SE) topics based on accident casual factors. The group established a total of 23 SE topics after several months of studying and researching accident reports between 2001 and 2011. The accident analysis covered topics ranging from transition training to medication usage. The group then developed safety intervention strategies for each topic and carefully scored each proposed strategy for overall effectiveness and feasibility. Among these strategies is a safety awareness campaign that involves highlighting one SE topic each month in a coordinated communications effort.

The program kicked off in June with its first SE topic: stabilized approach and landing. The intent of this intervention strategy is to have those involved with the LOCWG, as well as academia, industry partners, and aviation media outlets, coordinate an outreach "blitz" each month based on the current topic. The messages are aimed at conveying key teaching points and will include references to FAA handbooks and resources as well as existing articles on the subject.

"We're working together with industry more than ever before, with a much greater level of coordination on what initiatives need to go out," says FAA Safety Team National Operations Lead Kevin Clover. "The content may come in different shapes and sizes, but the overall message will be uniform and practical."

To support this effort, *FAA Safety Briefing* will produce regular online articles that coincide with each month's topic. These will be available on our home page (www.faa.gov/news/safety_briefing). Just look for the Safety Enhancement Topic of the Month link. We also plan to provide a series of safety tips and helpful links related to each month's topic on our Twitter account (@FAASafetyBrief) and on the FAA's Facebook page (www.facebook.com/FAA). Below is an example of the ads you'll see in future issues of *FAA Safety Briefing* that will identify each of the two monthly topics covered during the span of that issue.

Tom Hoffmann is the managing editor of FAA Safety Briefing. *He is a commercial pilot and holds an A&P certificate.*

Safety Enhancement Topics

July

Angle of Attack (AOA) Systems

An aircraft can stall at any speed, attitude, or power setting. Using airspeed alone to determine the critical AOA is not always reliable. An AOA indicator can help pilots detect this otherwise invisible airfoil position and avoid a stall. For more information, go to faa.gov/news/safety_briefing.

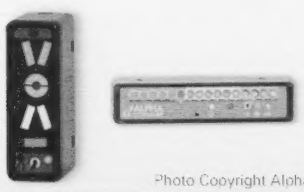


Photo Copyright Alpha Systems AOA

August

Flight Risk Analysis Tools

A flight risk analysis tool (FRAT) can be a helpful addition to flight planning and can aid greatly with making better go/no-go decisions. And many are easy to obtain as apps for your smartphone. Find out more about how these tools can reduce flight risks at faa.gov/news/safety_briefing.

GARY ROACH

Bird Strikes – Are You Prepared?

On a fall day in 2011, an emergency medical service helicopter was traveling at about 100 knots and around 1,000 feet above ground level (AGL) when the pilot began preparations for final approach. A patient, a relative of the patient, and two EMS crew members were on board.

The incident report states that just before the pilot lowered his visor, a pair of mallard ducks smashed through the windscreen and hit the pilot in the face. Bird remains and the rush of air into the aircraft stunned and momentarily blinded the pilot. As noted in the report, the helicopter plunged about 500 feet.

The pilot lost a few teeth and suffered a damaged jaw, a broken nose, and temporary numbness in his left arm, but he managed to safely land the helicopter. The initial pilot report stated: "Bird strike, landing uneventful." But as radio commentator Paul Harvey once stated, "Now you know the rest of the story."

A report this dramatic doesn't usually land on my desk. However, it illustrates a growing problem caused partly by the combination of an increasing population of large birds and quieter helicopters that give birds less warning that a major object is in their path.

Wildlife strikes have killed more than 231 people and destroyed more than 220 aircraft of all types worldwide since 1988, according to a July 2012 report from the FAA and the U.S. Department of Agriculture – and the report's authors consider that number to be a conservative estimate.

Most (116,408) of the 119,917 reported strikes from 1990 through 2011 against civil aircraft in the United States involved birds. The number of bird strikes was followed by 2,754 encounters with terrestrial mammals (deer and coyotes on the runway, for example), 618 bats, and 137 reptiles, such as snakes dropped in flight by birds. About 10 percent of the strikes damaged the aircraft.

Arguably the best known birdstrike involved a plane. US Airways Captain Chesley "Sully" Sullenberger became a national hero when he safely landed his Airbus A320 in the Hudson River on January 15, 2009, after the plane collided with a flock of Canada geese on climb-out from New York's LaGuardia Airport. Both engines lost power, but all 155 people onboard survived.

If a bird collides with an aircraft, chances are it will do so between July and October, when they are most active. And chances are it will be a gull, followed by a pigeon/dove, raptor, or waterfowl.

North America has experienced an explosion of the bird population during the past three decades as birds adapt to urban environments and airports. This increase includes 13 of the continent's 14 bird species that average more than eight pounds, according to the FAA-USDA report.

Meanwhile, U.S. commercial air traffic has increased 42 percent from 17.8 million flights in 1980 to 25.2 million in 2011. This intersection of trends has resulted in more bird strikes, causing an estimated 586,170 hours of aircraft downtime and economic losses of $718 million from 1990 through 2011 in the U.S. civil aviation industry, according to the report.

Most helicopters are not certified to resist bird strikes, but pilots can reduce the risk of a bird strike by following certain preventive measures:

- Increase altitude. 76 percent of bird strikes occur below 500 feet AGL and 97 percent occur below 3,500 feet AGL. Additionally, birds instinctively dive when threatened to gain airspeed and maneuverability.
- Avoid flights over bird prone areas, such as wildlife sanctuaries, landfills, and fish packing plants. If you must fly over bird prone areas, fly slowly until reaching a safe altitude.
- Wear protective eyewear with shatter resistant lenses when operating in areas of potential bird strikes.
- Keep landing/pulse lights on to get the birds' attention.

Requirements for reporting a bird strike depend on the amount of damage, but the FAA requests that pilots report all bird strikes. While these incidents can be reported through normal channels with a local Flight Standards Office, the FAA strongly encourages pilots to report the strike to the website http://wildlife.faa.gov. The FAA needs this data to justify rules to make aircraft more resilient to bird strikes. We hope never to see another case of a bird flying through a helicopter's windscreen.

Gary Roach began his engineering career at Bell Helicopter in 1976 before joining the FAA in 1982. He has since worked as a propulsion and structures specialist, a project manager, a supervisor and a senior engineer for rotorcraft and fixed-wing aircrafts.

Flight Forum

Eyes Have It

I want to thank you for doing the research and clearly communicating the results for your article, "The Eyes Have It" published in the Jan/Feb edition of *FAA Safety Briefing*. While I have wondered about and researched the various kinds of eye surgeries, I am very impressed with your summary which I found both easy-to-understand and enjoyable to read.

— Ann

Thanks for the note and the comments. We are very glad you found it helpful in making a decision about how you want to proceed with corrective eye surgery.

Reprints OK?

Our aviation safety team would like to publish some of the articles that appear in your magazine. We would also like to use them in the classroom. Would that be OK?

— Gene

Articles written by FAA Safety Briefing *staff are public domain, but we do request that you credit* FAA Safety Briefing *magazine as the source. Articles written by other (i.e., non-staff) contributors are marked with a copyright; you would need to contact the author for permission to reprint the piece.*

Wings Foul

I really like the concept of continuing education for all pilots, however, the current concept for the wings that are used for the FAA Wings program remind me of a canopy turkey buzzard strike. I bet a lot more people would like to earn the wings if they didn't look like a flattened buzzard stuck to a windscreen.

Just to get the ball rolling, I suggest that you take the Civil Air Patrol wings and substitute the FAA seal for the circle in the middle. Having bronze, silver and gold wings is a good concept, but please refine the design to look a little more clean.

— Tyler

We'll pass your suggestion along to the folks in that program. As you may know, though, industry partners provide the actual WINGS pins, not the FAA. The WINGS were designed and are provided, out of courtesy, from our industry member, AVEMCO. Again, thank you for your feedback.

Great Job!

You guys are doing a great job and are making a very positive impact on the public image of the FAA!

— Melvin

We appreciate your feedback. Our mission at FAA Safety Briefing *is to be the safety policy voice of non-commercial general aviation and we are glad to hear we are hitting the mark!*

FAA Safety Briefing welcomes comments. We may edit letters for style and/or length. If we have more than one letter on a topic, we will select a representative letter to publish. Because of publishing schedule, responses may not appear for several issues. While we do not print anonymous letters, we will withhold names or send personal replies upon request. If you have a concern with an immediate FAA operational issue, contact your local Flight Standards District Office or air traffic facility. Send letters to: Editor, *FAA Safety Briefing*, AFS-805, 800 Independence Avenue, SW, Washington, DC 20591, or email SafetyBriefing@faa.gov.

Let us hear from you — comments, suggestions, and questions: email SafetyBriefing@faa.gov or use a smartphone QR reader to go "VFR-direct" to our mailbox.

SUSAN PARSON

What Was *That*?!

Life is a long preparation for something that never happens. – William Butler Yeats

The Irish poet, dramatist, and Nobel laureate William Butler Yeats was not a pilot, but his deft observation certainly applies to those who ply the skies. We train for all kinds of eventualities. We study things that can go wrong. We seek to master the many aspects of the known in order to be prepared for what is unknown, unforeseen, and unpredictable.

Most of the time, that "something" we train for and prepare to handle never happens. Today's pilots benefit from the many developments in aviation technology and operational know-how. Thanks to those advances, most flights are utterly routine and predictable from the mechanical perspective.

Except for those times when something *does* happen.

On a bright spring day, I was delighted by the chance to go flying with a friend and former FAA colleague. We did a thorough preflight inspection that revealed nothing amiss, and happily launched my club's C182 *Skylane* from its home base for an easy VFR cross-country down the Shenandoah Valley. I can honestly say that neither of us was in the "fat, dumb, and happy" mindset of complacency. We were mindful that the airplane had just completed a long stint in the hangar for annual inspection and repairs. Though it had been flown several times since its return to service, we both knew that sometimes stuff happens in the first few hours after shop work. And, since the number of empty tiedown slots was a strong suggestion of aerial congestion, we chose to fly a course slightly offset from the magenta line and at an altitude slightly off the "cardinal" numbers to reduce our chances of unplanned formation with fellow springtime sky-riders.

Most of the time, the "something" we train and prepare to handle never happens. Our flights are utterly routine and predictable … except for those times when something does happen.

Everything was perfectly normal and utterly routine until the moment when, about 40 minutes into the flight, the engine seemed to stumble. "What was *that*?!" I don't remember who actually said it, but we both had the thought. It was no more than a second's worth of hesitation, but it was more than sufficient to silence crew conversation and kick crew concentration into high gear. Instantly we were scanning the gauges for any sign of anomaly or explanation. All indications were normal, but we launched into risk mitigation activities: Adjust power settings and mixture; apply carb heat; gain altitude; determine distance and direction to nearest suitable airport.

With the engine running smoothly once again, we initially opted to continue the flight. But a second, slightly longer hiccup about 10 minutes later abruptly changed the plan. We repeated actions taken the first time, and our growing suspicion of possible carburetor icing seemed confirmed when re-application of carb heat produced the textbook results: a momentary increase in roughness as carb ice melts and moves through the hydrophobic engine.

Even when you know that the initial increase in roughness indicates that the carb heat is doing its job, it's still a great relief when it smooths out once again. At that point, though, we decided we'd had enough fun and opted to head back to home base. My trusty iPad Mini with its suite of sweet aviation apps was a terrific auxiliary crew member, making it incredibly easy to plot an airport-to-airport course, quickly find the nearest frequency to request VFR flight following, and remain clear of the many airspace and altitude restrictions common to this part of the National Airspace System.

The remainder of the flight was utterly uneventful. Our brief carb ice encounter was a bit of a downer on an otherwise nice flying day, but it was a great reminder of how important it is to be prepared for anything and everything at any time and any place. Know your airplane, know your equipment (including the iPad), and know your crew capabilities (including your own). Better to be prepared for "something that never happens" because when it comes to aviation, "never" is always a bad bet.

Susan Parson (susan.parson@faa.gov, or @avi8rix for Twitter fans) is editor of FAA Safety Briefing. *She is an active general aviation pilot and flight instructor.*

PAUL CIANCIOLO

FAA Faces

Kenneth C. Thomas

Aviation Safety Inspector, Alaska Region Safety Analysis and Evaluation Branch

Kenneth Thomas on a hunting trip with his son, Cole, in the remote Brooks Range of Alaska.

Preparedness has been important to Alaska Aviation Safety Inspector (ASI) Ken Thomas for his entire life. Ken grew up hunting, trapping, and fishing in rural South Dakota, and developed a very early appreciation for the value of planning ahead. His interest in the great outdoors eventually led him to Alaska, where he settled after earning his airframe and powerplant (A&P) certificates in 1986.

Ken launched his aviation career in 1987, performing maintenance on float plans for Temsco Airlines in Ketchikan, Alaska. Two years after that, he bought a Piper *Super Cub* that had been wrecked as a reconstruction project. After completing the repairs, he decided it was time he learned to fly — after all, Alaskans rely heavily on aviation as a means of transport and supply as well as recreation.

As is typical for Alaskan aviators, most of Ken's flights are conducted to rugged off-airport locales — gravel bars, ridge tops, beaches, hillsides, frozen lakes, and sea ice. "Ski flying is probably one of my favorite things to do," he states. "When you are on skis, the whole world can be a runway in the winter." As you might expect, he has also accumulated most of his flight time in tailwheel aircraft on skis or, during the summer, on tundra tires.

The great diversity of flying in Alaska has heightened Ken's appreciation for the importance of preparedness. In Ken's view, preparedness for safe operation as a pilot or mechanic includes training, knowledge, and awareness of personal abilities and limitations. "Take every operation, and especially every landing, seriously. It also pays to get regular instruction for proficiency, and definitely get specialized instruction if you plan to fly in remote areas."

Ken also sees preparedness as a mindset: "A lot of folks think it won't happen to them, but being prepared when something *does* happen can save a lot of time and grief." For that reason, he never flies without a tent, sleeping bag, water purifier, and rifle. "I highly recommend survival gear," he states. "I've spent as much as seven days waiting for weather to lift in the Brooks Range of Alaska after a hunting or fishing trip."

In addition, he carries a satellite phone and SPOT GPS tracking device. For added safety, Ken recently equipped his aircraft with a new digital 406 emergency locator transmitter (ELT). "Alaska is no place for complacency," he stresses. "I've seen several instances where people could have been saved from an accident or suffered less severe injuries if they had an upgraded ELT for faster rescue."

Ken's passion for aviation safety eventually led him to a job with the FAA, where he started as an airworthiness inspector in Fairbanks in 1998. As the sole mechanic working at a remote site, Ken remembers the fear people around the airport had of the FAA. "I didn't understand that," he observes. "I figured that all I need to do is do my job right, and be ready to show that at any time. So I told the FAA folks that they were welcome any time to look at anything. That approach has always served me well."

So has his varied experience. As Ken observes, the diversity of aircraft makes, models, and configurations in Alaska means that an ASI has to be prepared for anything. On a typical day, an ASI can deal with a float-flying operation in the morning, then move to airport ski and tundra tire-equipped operations, and at the end the day work with airport commuter operations.

These days, Ken works remotely. His position requires him to analyze information that is used to determine the need for inspections and evaluate accident and incident information. Some of his analysis work leads to writing FAA safety recommendations — a program he strongly supports as a means of enhancing aviation safety. Asked for his advice to fellow aviators, Ken has a simple comment: "Take every part of your flying seriously, and be sure to plan and train to be prepared for anything life throws at you. That's the key not only for staying alive, but also for enjoying what you do."

Paul Cianciolo is an assistant editor and the social media lead for FAA Safety Briefing. *He is a U.S. Air Force veteran, and a rated aircrew member and search and rescue team leader with the Civil Air Patrol.*

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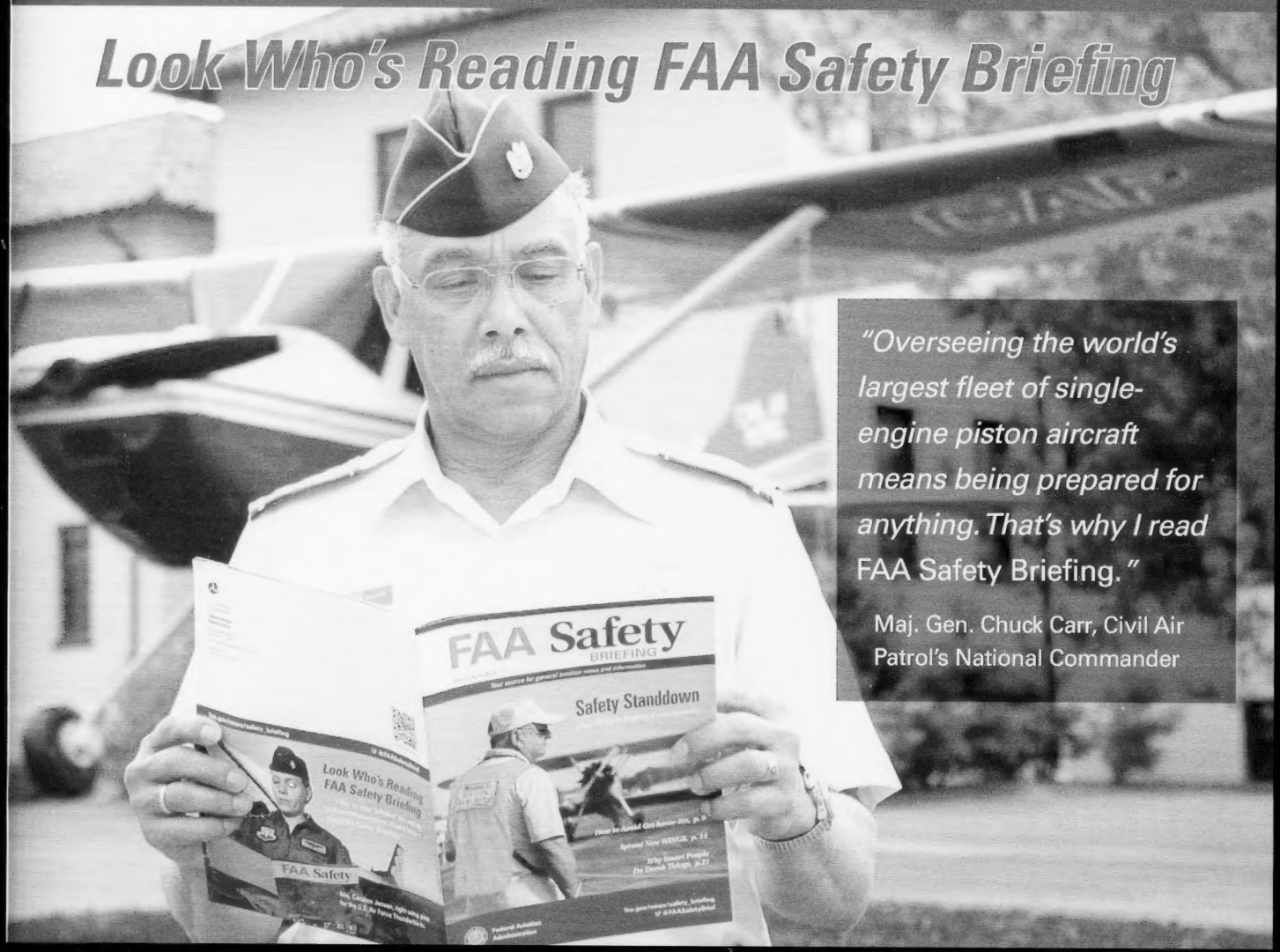

"Overseeing the world's largest fleet of single-engine piston aircraft means being prepared for anything. That's why I read FAA Safety Briefing. *"*

Maj. Gen. Chuck Carr, Civil Air Patrol's National Commander